



SEQUENCE LISTING

<10> Tao, Tao  
Skiadopoulos, Mario H.  
Collins, Peter L.  
Murphy, Brian R.

<120> CONSTRUCTION AND USE OF RECOMBINANT PARAINFLUENZA  
VIRUSES EXPRESSING A CHIMERIC GLYCOPROTEIN

<130> 17634-000340US

<140> 09/459,062

<141> 1999-12-10

<150> 09/083,793

<151> 1998-05-22

<150> 60/059,385

<151> 1997-09-19

<150> 60/047,575

<151> 1997-05-23

<160> 57

<170> PatentIn Ver. 2.1

<210> 1

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Flanking  
sequence of measles HA gene insert for N-P and P-M  
junctions.

<400> 1

cttaagaata tacaaataag aaaaacttag gattaaagag cg

42

<210> 2

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Flanking  
sequence of measles HA gene insert for N-P and P-M  
junctions.

<400> 2  
gatccaacaa agaaacgaca ccgaacaaac cttaag

36

<210> 3  
<211> 101  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Flanking  
sequence of measles HA gene insert for HN-L  
junction.

<400> 3  
aggcctaaaa gggaaatata aaaaacttag gagtaaagtt acgcaatcca actctactca 60  
tataattgag gaaggaccca atagacaaat ccaaattcga g 101

<210> 4  
<211> 79  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Flanking  
sequence of measles HA gene insert for HN-L  
junction.

<400> 4  
tcataattaa ccataatatg catcaatcta tctataatac aagtatatga taagtaatca 60  
gcaatcagac aataggcct 79

<210> 5  
<211> 83  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Forward primer  
for PCR of measles HA gene insert for N-P and P-M  
junction.

<400> 5  
ttaatcttaa gaatatacaa ataagaaaaa cttaggatta aagagcgatg tcaccacaac 60  
gagaccgat aaatgccttc tac 83

<210> 6  
<211> 67  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Reverse primer  
for PCR of measles HA gene insert for N-P and P-M  
junctions.

<400> 6  
attattgctt aaggtttgtt cgggtgctgt tctttgttgg atcctatctg cgattgggtc 60  
catcttc 67

<210> 7  
<211> 55  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Forward primer  
for PCR of measles HA gene insert for HN-L  
junction.

<400> 7  
gacaataggc ctaaaagga aatataaaaa acttaggagt aaagttacgc aatcc 55

<210> 8  
<211> 68  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Reverse/Forward primer for PCR of measles HA gene  
insert for HN-L junction.

<400> 8  
gtagaacgcg tttatccggt ctcgttgtgg tgacatctcg aatttggatt tgtctattgg 60  
gtccttc 68

<210> 9  
<211> 77  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Forward primer  
for PCR of measles HA gene insert for HN-L  
junction.

<400> 9  
cagtcacccg ggaagatgga accaatcgca gatagtcata attaaccata atatgcatca 60  
atctatctat aatacaa 77

<210> 10  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Reverse primer  
for PCR of measles HA gene insert for HN-L  
junction.

<400> 10  
ccatgtaatt gaatccccca acactagc 28

<210> 11  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Forward/Reverse primer for PCR of measles HA gene  
insert for HN-L junction.

<400> 11  
cggataaacg cggttctacaa agataacc 28

<210> 12  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer  
for PCR of measles HA gene for N-P and M-P  
junctions.

<400> 12

ccatcttccc gggtgactgt gcagc

25

<210> 13

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Upstream HPIV2  
HN primer.

<400> 13

gggccatgga agattacagc aat

23

<210> 14

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Downstream  
HPIV2 HN primer.

<400> 14

caataagctt aaagcattag ttccc

25

<210> 15

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Upstream HPIV2  
HN primer.

<400> 15

gcatggggc cgaggaagga cccaatagac a

31

<210> 16  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: Downstream  
         HPIV2 HN primer.  
  
 <400> 16  
 cccgggtcct gatttcccga gcacgctttg 30  
  
  
 <210> 17  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: HPIV1 HN  
         primer.  
  
 <400> 17  
 agtggctaatt tgcattgcat ccacat 26  
  
  
 <210> 18  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: HPIV1 HN  
         primer.  
  
 <400> 18  
 gccgtctgca tggatgaatag caat 24  
  
  
 <210> 19  
 <211> 15492  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: Sequence of  
         pFLC.PIV32, 15492 bp in sense orientation.

<400> 19

```
accaaacaag agaagaaact tgtctgggaa tataaattta actttaaatt aacttaggat 60
taaagacatt gactagaagg tcaagaaaag ggaactctat aatttcaaaa atgttgagcc 120
tatttgatac atttaatgca cgtaggcaag aaaacataac aaaatcagcc ggtggagcta 180
tcattcctgg acagaaaaat actgtctcta tattegcctt tggaccgaca ataactgatg 240
ataatgagaa aatgacatta gctcttctat ttctatctca ttcactagat aatgagaaac 300
aacatgcaca aagggcaggg ttcttgggtg ctttattgtc aatggcttat gccaatccag 360
agctctacct aacaacaaat ggaagtaatg cagatgtcaa gtatgtcata tacatgattg 420
agaaagatct aaaacggcaa aagtatggag gatttgtggg taagacgaga gagatgatat 480
atgaaaagac aactgattgg atatttggaa gtgacctgga ttatgatcag gaaactatgt 540
tgcagaacgg caggaacaat tcaacaattg aagaccttgt ccacacattt gggatatccat 600
catgtttagg agctcttata atacagatct ggatagttct ggtcaaagct atcactagta 660
tctcaggggt aagaaaaggc tttttcaccg gattggaagc tttcagacaa gatggaacag 720
tgcaggcagg gctgggtatt agcgggtgaca cagtggatca gattgggtca atcatgcgg 780
ctcaacagag cttggtaact cttatgggtg aaacattaat aacaatgaat accagcagaa 840
atgacctcac aaccatagaa aagaatatac aaattgttgg caactacata agagatgcag 900
gtctcgcttc attcttcaat acaatcagat atggaattga gaccagaatg gcagctttga 960
ctctatccac tctcagacca gatatcaata gattaaaagc tttgatggaa ctgtatttat 1020
caaagggacc acgcgctcct ttcactctga tctcagaga tctatacat ggtgagttcg 1080
caccaggcaa ctatcctgcc atatggagct atgcaatggg ggtggcagtt gtacaaaata 1140
gagccatgca acagtatgtg acgggaagat catatctaga cattgatatg ttccagctag 1200
gacaagcagt agcacgtgat gccgaagctc aaatgagctc aacactggaa gatgaacttg 1260
gagtgcacac cgaatctaaa gaaagcttga agagacatat aaggaacata aacagttcag 1320
agacatcttt ccacaaaccg acaggtggat cagccataga gatggcaata gatgaagagc 1380
cagaacaatt cgaacataga gcagatcaag acaaaaatgg agaacctcaa tcatccataa 1440
ttcaatatgc ctgggcagaa ggaaatagaa gcgatgatca gactgagcaa gctacagaat 1500
ctgacaatat caagaccgaa caacaaaaca tcagagacag actaaacaag agactcaacg 1560
acaagaagaa acaaagcagt caaccacca ctaatccac aaacagaaca aaccaggacg 1620
aaatagatga tctgtttaac gcatttggaa gcaactaatc gaatcaacat tttaatctaa 1680
atcaataata aataagaaaa acttaggatt aaagaatcct atcataccgg aatatagggg 1740
ggtaaattta gagtctgctt gaaactcaat caatagagag ttgatggaaa gcgatgctaa 1800
aaactatcaa atcatggatt cttgggaaga ggaatcaaga gataaatcaa ctaatatctc 1860
ctcgccctc aacatcattg aattcatact cagcacgcac cccaagaag acttatcgga 1920
aaacgcacac atcaacacaa gaaccagca actcagtgcc accatctgtc aaccagaaat 1980
caaaccaaca gaaacaagtg agaaagatag tggatcaact gacaaaaata gacagtccgg 2040
gtcatcacac gaatgtacaa cagaagcaaa agatagaaat attgatcagg aaactgtaca 2100
gagaggacct gggagaagaa gcagctcaga tagtagagct gagactgtgg tctctggagg 2160
aatccccaga agcatcacag attctaaaaa tggaaaccaa aacacggagg atattgatct 2220
caatgaaatt agaaagatgg ataaggactc tattgagggg aaaatgagc aatctgcaaa 2280
tggtccaagc gagatatcag gaagtgatga catatttaca acagaacaaa gtagaaacag 2340
tgatcatgga agaagcctgg aatctatcag tacacctgat acaagatcaa taagtgttgt 2400
tactgtgca acaccagatg atgaagaaga aataactaatg aaaaatagta ggacaaagaa 2460
aagttcttca acacatcaag aagatgacaa aagaattaaa aaagggggaa aagggaaaga 2520
ctgggtttaag aaatcaaaaag ataccgacaa ccagatacca acatcagact acagatccac 2580
atcaaaaggg cagaagaaaa tctcaaagac aacaaccacc aacaccgaca caaaggggca 2640
aacagaaata cagacagaat catcagaaac acaatcctca tcatggaatc tcatcatcga 2700
caacaacacc gaccggaacg aacagacaag cacaactcct ccaacaacaa cttccagatc 2760
```

aacttataca	aaagaatcga	tccgaacaaa	ctctgaatcc	aaacccaaga	cacaaaagac	2820
aatggaaaag	gaaaggaagg	atacagaaga	gagcaatcga	tttacagaga	gggcaattac	2880
tctattgcag	aatcttggtg	taattcaatc	cacatcaaaa	ctagatttat	atcaagacaa	2940
acgagttgta	tgtgtagcaa	atgtactaaa	caatgtagat	actgcatcaa	agatagattt	3000
cctggcagga	ttagtcatag	gggtttcaat	ggacaacgac	acaaaattaa	cacagatata	3060
aatgaaatg	ctaaacctca	aagcagatct	aaagaaaatg	gacgaatcac	atagaagatt	3120
gatagaaaat	caaagagaac	aactgtcatt	gatcacgtca	ctaatttcaa	atctcaaaat	3180
tatgactgag	agaggaggaa	agaaagacca	aatgaatcc	aatgagagag	tatccatgat	3240
caaaacaaaa	ttgaaagaag	aaaagatcaa	gaagaccagg	tttgaccac	ttatggaggc	3300
acaaggcatt	gacaagaata	taccgatct	atatcgacat	gcaggagata	cactagagaa	3360
cgatgtacaa	gttaaatacag	agatattaag	ttcatacaat	gagtcaaata	caacaagact	3420
aatacccaaa	aaagtgcgca	gtacaatgag	atcactagtt	gcagtcatca	acaacagcaa	3480
tctctcacia	agcacaaaac	aatcatacat	aaacgaactc	aaacggttgc	aaaatgatga	3540
agaagtatct	gaattaatgg	acatgttcaa	tgaagatgtc	aacaattgcc	aatgatccaa	3600
caaagaaacg	acaccgaaca	aacagacaag	aaacaacagt	agatcaaaac	ctgtcaacac	3660
acacaaaatc	aagcagaatg	aaacaacaga	tatcaatcaa	tatacaata	agaaaaactt	3720
aggattaaag	aataaattaa	tccttgtcca	aatgagtat	aactaactct	gcaatataca	3780
cattcccaga	atcatcattc	tctgaaaatg	gtcatataga	accattacca	ctcaaagtca	3840
atgaacagag	gaaagcagta	ccccacatta	gagttgccaa	gatcggaaat	ccacaaaaac	3900
acggatcccg	gtatttagat	gtcttcttac	tcggcttctt	cgagatggaa	cgaatcaaag	3960
acaaatacgg	gagtgatgaat	gatctcgaca	gtgaccggag	ttacaaagtt	tgtggctctg	4020
gatcattacc	aatcggattg	gctaagtaca	ctgggaatga	ccaggaattg	ttacaagccg	4080
caaccaaact	ggatatagaa	gtgagaagaa	cagtcaaagc	gaaagagatg	gttgtttaca	4140
cgggtacaaa	tataaaacca	gaactgtacc	catggtccaa	tagactaaga	aaaggaatgc	4200
tgttcgatgc	caacaaagtt	gctcttgctc	ctcaatgtct	tccactagat	aggagcataa	4260
aatttagagt	aatcttcgtg	aattgtacgg	caattggatc	aataaccttg	ttcaaaattc	4320
ctaagtcaat	ggcatcacta	tctctaccca	acacaatatc	aatcaatctg	cagggtacaca	4380
taaaaacagg	ggttcagact	gattctaaag	ggatagttca	aattttggat	gagaaaggcg	4440
aaaaatcact	gaatttcattg	gtccatctcg	gattgatcaa	aagaaaagta	ggcagaatgt	4500
actctgttga	atactgtaaa	cagaaaatcg	agaaaatgag	attgatattt	tctttaggac	4560
tagttggagg	aatcagtcct	catgtcaatg	caactgggtc	catatcaaaa	acactagcaa	4620
gtcagctggt	attcaaaaga	gagatttggt	atcctttaat	ggatctaaat	ccgcatctca	4680
atctagttat	ctgggcttca	tcagtagaga	ttacaagagt	ggatgcaatt	ttccaacctt	4740
ctttacctgg	cgagttcaga	tactatccta	atattattgc	aaaaggagtt	gggaaaatca	4800
aacaatggaa	ctagtaatct	ctatttttagt	ccggacgtat	ctattaagcc	gaagcaaata	4860
aaggataatc	aaaaacttag	gacaaaagag	gtcaatacca	acaactatta	gcagtcacac	4920
tcgcaagaat	aagagagaag	ggaccaaaaa	agtcaaatag	gagaaatcaa	aacaaaaggt	4980
acagaacacc	agaacaacaa	aatcaaaaaca	tccaactcac	tcaaaaacaaa	aattccaaaa	5040
gagaccggca	acacaacaag	cactgaacac	catggatcac	ctgcatccaa	tgatagtatg	5100
catttttggt	atgtacactg	gaattgtagg	ttcagatgcc	attgctggag	atcaactcct	5160
caatgtaggg	gtcattcaat	caaagataag	atcactcatg	tactacactg	atgggtggcg	5220
tagctttatt	gttgtaaaat	tactacccaa	tcttccccca	agcaatggaa	catgcaacat	5280
caccagtcta	gatgcatata	atgttaccct	atttaagttg	ctaacacccc	tgattgagaa	5340
cctgagcaaa	atttctgctg	ttacagatac	caaaccgccg	cgagaacgat	ttgcaggagt	5400
cgttattggg	cttgctgcac	taggagtagc	tacagctgca	caaataaccg	cagctgtagc	5460
aatagtaaaa	gccaatgcaa	atgctgctgc	gataaacaat	cttgcatctt	caattcaatc	5520
caccaacaag	gcagtatccg	atgtgataac	tgcatcaaga	acaattgcaa	ccgcagttca	5580
agcgattcag	gatcacatca	atggagccat	tgtcaacggg	ataacatctg	catcatgccg	5640



tgcccatgat	gcactaattg	ggccaatatt	aaatttgtat	ctcactgagc	ttactacaat	5700
atttcataat	caaataacaa	accctgcgct	gacaccactt	tccatccaag	ctttaagaat	5760
cctcctcggt	agcaccttgc	caattgtcat	tgaatccaaa	ctcaacacaa	aactcaacac	5820
agcagagctg	ctcagtagcg	gactgttaac	tggtcaaata	atttccattt	ccccaatgta	5880
catgcaaattg	ctaattcaaa	tcaatgttcc	gacatttata	atgcaaccgg	gtgcgaaggt	5940
aattgatcta	attgctatct	ctgcaaacca	taaattacaa	gaagtagttg	tacaagttcc	6000
taatagaatt	ctagaatatg	caaatgaact	acaaaactac	ccagccaatg	attgtttcgt	6060
gacaccaaac	tctgtatttt	gtagatacaa	tgagggttcc	ccgatccctg	aatcacaata	6120
tcaatgctta	agggggaatc	ttaattcttg	cactttttacc	cctattatcg	ggaactttct	6180
caagcgattc	gcatttgcca	atggtgtgct	ctatgccaac	tgcaaatctt	tgctatgtaa	6240
gtgtgccgac	cctcccatg	ttgtgtctca	agatgacaac	caaggcatca	gcataattga	6300
tattaagagg	tgctctgaga	tgatgcttga	cacttttttca	tttaggatca	catctacatt	6360
caatgctaca	tacgtgacag	acttctcaat	gattaatgca	aatattgtac	atctaagttcc	6420
tctagacttg	tcaaatcaaa	tcaattcaat	aaacaaatct	cttaaaaagt	ctgaggattg	6480
gattgcagat	agcaacttct	tcgctaata	agccagaaca	gccaagacac	tttattcact	6540
aagtgcatac	gcattaatac	tatcagtgat	tactttgggt	gttgtgggat	tgctgattgc	6600
ctacatcatc	aagctgggtt	ctcaaatcca	tcaattcaga	gcactagctg	ctacaacaat	6660
gttccacagg	gagaatcctg	cctcttttcc	caagaacaat	catggaaaca	tatatgggat	6720
atcttaggat	ccctacagat	cattagatat	taaaattata	aaaaacttag	gagtaaagtt	6780
acgcaatcca	actctactca	tataattgag	gaaggaccca	atagacaaat	ccaaatccat	6840
ggaagattac	agcaatctat	ctcttaaatc	aattcctaaa	aggacatgta	gaatcatttt	6900
ccgaactgcc	acaattcttg	gcatatgcac	attaattgtg	ctatgttcaa	gtattcttca	6960
tgagataaatt	catcttgatg	tttctctctg	tcttatgaat	tctgatgagt	cacagcaagg	7020
cattattcag	cctatcatag	aatcattaaa	atcattgatt	gctttggcca	accagattct	7080
atataatgtt	gcaatagtaa	ttctctttaa	aattgacagt	atcgaaactg	taatactctc	7140
tgcttttaaaa	gatatgcaca	ccgggagtat	gtccaatgcc	aactgcacgc	caggaaatct	7200
gcttctgcat	gatgcagcat	acatcaatgg	aataaaca	ttccttgtac	ttgaatcata	7260
caatgggacg	cctaaatatg	gaactctcct	aaatataccc	agcttttatcc	cctcagcaac	7320
atctcccat	gggtgtacta	gaataccatc	atcttccactc	atcaagaccc	attgggtgta	7380
cactcacaat	gtaatgcttg	gagattgtct	tgatttcacg	gcatacacc	agtatttatc	7440
aatggggata	atacaacaat	ctgctgcagg	gtttccaatt	ttcaggacta	tgaaaaccat	7500
ttacctaagt	gatggaatca	atcgcaaaag	ctgttcagtc	actgctatac	caggagggtg	7560
tgtcttgtat	tgctatgtag	ctacaaggtc	tgaaaaagaa	gattatgcca	cgactgatct	7620
agctgaactg	agacttgctt	tctattatta	taatgatacc	tttattgaaa	gagtcataatc	7680
tcttccaaat	acaacagggc	agtgggccac	aatcaaccct	gcagtcggaa	gcgggatcta	7740
tcatctaggc	tttatcttat	ttctgtata	tggtggtctc	ataaatggga	ctacttotta	7800
caatgagcag	tctcacgct	atcttatccc	aaaacatccc	aacataactt	gtgccggtaa	7860
ctccagcaaa	cagggtgcaa	tagcacggag	ttctatgtc	atccgttatc	actcaaacag	7920
gttaattcag	agtgtgttcc	ttatttgtcc	attgtctgac	atgcatacag	aagagtgtaa	7980
tctagttatg	tttaacaatt	cccaagtcac	gatgggtgca	gaaggtaggc	tctatgttat	8040
tggtataaat	ttgtattatt	atcaacgcag	ttctcttgg	tggtctgcat	cgctctttta	8100
caggatcaat	acagattttt	ctaaaggaat	tctccgac	attgaggctc	aatgggtacc	8160
gtcctatcaa	gttctctgct	ctggagtcac	gccatgcaat	gcaacaagtt	tttgccctgc	8220
taattgcac	acaggggtgt	acgcagatgt	gtggccgctt	aatgatccag	aactcatgtc	8280
acgtaatgct	ctgaacccca	actatcgatt	tgctggagcc	tttctcaaaa	atgagtccaa	8340
ccgaactaat	cccacattct	acactgcac	ggctaactcc	ctcttaata	ctaccggatt	8400
caacaacacc	aatcacaag	cagcatatac	atcttcaacc	tgcttttaaaa	acactggaac	8460
ccaaaaaatt	tattgtttta	taataattga	aatgggctca	tctcttttag	gggagttcca	8520

aataatacca	tttttaaggg	aactaatgct	ttaagcttaa	ttaaccataa	tatgcatcaa	8580
tctatctata	atacaagtat	atgataagta	atctgcaatc	agacaataga	caaaagggaa	8640
atataaaaaa	cttaggagca	aagcgtgctc	gggaaatgga	cactgaatct	aacaatggca	8700
ctgtatctga	catactctat	cctgagtgtc	accttaactc	tcctatcggt	aaaggtaaaa	8760
tagcacaatt	acacactatt	atgagtctac	ctcagcctta	tgatatggat	gacgactcaa	8820
tactagttaa	cactagacag	aaaataaaaac	ttaataaatt	ggataaaaga	caacgatcta	8880
ttagaagatt	aaaattaata	ttaactgaaa	aagtgaatga	cttaggaaaa	tacacattta	8940
tcagatatcc	agaaatgtca	aaagaaatgt	tcaaattata	tatacctggg	attaacagta	9000
aagtgactga	attattactt	aaagcagata	gaacatatag	tcaaatgact	gatggattaa	9060
gagatctatg	gattaatgtg	ctatcaaaaat	tagcctcaaa	aatgatgga	agcaattatg	9120
atcttaaatga	agaaattaat	aatatatcga	aagttcacac	aacctataaa	tcagataaat	9180
ggtataatcc	attcaaaaaca	tggtttacta	tcaagtatga	tatgagaaga	ttacaaaaag	9240
ctcgaaatga	gatacctttt	aatgttgagg	aggattataa	cttgtagaa	gaccagaaga	9300
atctcttatt	gatacatcca	gaattgggtt	tgatattaga	taaacaaaac	tataatgggt	9360
atctaattac	tcctgaatta	gtattgatgt	attgtgacgt	agtcgaaggc	cgatggaata	9420
taagtgcatt	tgctaagtta	gatccaaaat	tacaatctat	gtatcagaaa	ggtaataacc	9480
tgtgggaagt	gatagataaa	ttgtttccaa	ttatgggaga	aaagacattt	gatgtgatat	9540
cggtattaga	accacttgca	ttatccttaa	ttcaaaactc	tgatcctggt	aaacaactaa	9600
gaggagcttt	tttaaatacat	gtgttatccg	agatggaatt	aatatttgaa	tctagagaat	9660
cgattaagga	atctctgagt	gtagattaca	ttgataaaaat	tttagatata	tttaataagt	9720
ctacaataga	tgaaatagca	gagattttct	cttttttttag	aacatttggg	catcctccat	9780
tagaagctag	tattgcagca	gaaaagggtta	gaaaatatat	gtatattgga	aaacaattaa	9840
aatttgacac	tattaataaa	tgtcatgcta	tcttctgtac	aataataatt	aacggatata	9900
gagagaggca	tggtggacag	tggcctcctg	tgacattacc	tgatcatgca	cacgaattca	9960
tcataaatgc	ttacgggttca	aactctgcga	tatcatatga	aatgctggt	gattattacc	10020
agagctttat	aggaataaaa	ttcaataaat	tcatagagcc	tcagttagat	gaggatttga	10080
caatttatat	gaaagataaa	gcattatctc	caaaaaaatc	aaattgggac	acagtttatc	10140
ctgcatctaa	tttactgtac	cgtactaacg	catccaacga	atcacgaaga	ttagttgaag	10200
tatttatagc	agatagtaaa	tttgatcctc	atcagatatt	ggattatgta	gaatctgggg	10260
actggttaga	tgatccagaa	tttaatat	cttatagctc	ttaaagaaaa	gagatcaaac	10320
aggaaggtag	actctttgca	aaaatgacat	acaaaatgag	agctacacaa	gttttatcag	10380
agaccctact	tgcaaataac	ataggaaaat	tctttcaaga	aatgaggatg	gtgaaggagg	10440
agattgaatt	acttaagaga	ttaacaacca	tatcaatata	aggagttcca	cggtataatg	10500
aagtgtacaa	taattctaaa	agccatacag	atgaccttaa	aacctacaat	aaaataagta	10560
atcttaattt	gtcttcta	cagaaatcaa	agaaatttga	attcaagtca	acggatatct	10620
acaatgatgg	atacgagact	gtgagctggt	tcctaacaac	agatctcaaa	aaatactgtc	10680
ttaattggag	atatgaatca	acagctctat	ttggagaaac	ttgcaaccaa	atatttggat	10740
taaataaatt	gtttaattgg	ttacacctc	gtcttgaagg	aagtacaatc	tatgtagggtg	10800
atccttactg	tcctccatca	gataaagaac	atatatcatt	agaggatcac	cctgattctg	10860
gtttttacgt	tcataaccca	agagggggta	tagaaggatt	ttgtcaaaaa	ttatggacac	10920
tcataatctat	aagtgcataa	catctagcag	ctgttagaat	aggcgtgagg	gtgactgcaa	10980
tggttcaagg	agacaatcaa	gctatagctg	taaccacaag	agtacccaac	aattatgact	11040
acagagttaa	gaaggagata	gtttataaa	atgtagttag	atgttttgat	tcattaagag	11100
aagtgatgga	tgatctagggt	catgaactta	aattaaatga	aacgattata	agtagcaaga	11160
tgttcatata	tagcaaaaga	atctattatg	atggggagaat	tcttcctcaa	gctctaaaag	11220
cattatctag	atgtgtcttc	tggtcagaga	cagtaataga	cgaaacaaga	tcagcatctt	11280
caaatttggc	aacatcat	gcaaaagcaa	ttgagaatgg	ttattcacct	gttctaggat	11340
atgcatgctc	aatttttaag	aatattcaac	aactatata	tgccttggg	atgaatatca	11400

atccaactat	aacacagaat	atcagagatc	agtatttttag	gaatccaaat	tggatgcaat	11460
atgcctcttt	aatacctgct	agtgttgggg	gattcaatta	catggccatg	tcaagatggt	11520
ttgtaaggaa	tattggtgat	ccatcagttg	ccgcattggc	tgatattaaa	agattttatta	11580
aggcgaatct	attagaccga	agtgttcttt	ataggattat	gaatcaagaa	ccagggtgagt	11640
catctttttt	ggactgggct	tcagatccat	attcatgcaa	tttaccacaa	tctcaaaata	11700
taaccaccat	gataaaaaat	ataacagcaa	ggaatgtatt	acaagattca	ccaaatccat	11760
tattatctgg	attattcaca	aatacaatga	tagaagaaga	tgaagaatta	gctgagttcc	11820
tgatggacag	gaaggtaatt	ctccctagag	ttgcacatga	tattctagat	aattctctca	11880
caggaattag	aaatgccata	gctggaatgt	tagatacgac	aaaatcacta	attcggggtg	11940
gcataaatag	aggaggactg	acatatagtt	tggtgaggaa	aatcagtaat	tacgatctag	12000
tacaatatga	aacactaagt	aggactttgc	gactaattgt	aagtgataaa	atcaagtatg	12060
aagatatgtg	ttcggtagac	cttgccatag	cattgcgaca	aaagatgtgg	attcattttat	12120
caggaggaag	gatgataagt	ggacttgaaa	cgctgaccc	attagaatta	ctatctgggg	12180
tagtaataac	aggatcagaa	cattgtaaaa	tatgttattc	ttcagatggc	acaaacccat	12240
atacttggat	gtattttacc	ggtaatatca	aaataggatc	agcagaaaca	ggtatatcgt	12300
cattaagagt	tccttatttt	ggatcagtc	ctgatgaaag	atctgaagca	caattaggat	12360
atatcaagaa	tcttagtaaa	cctgcaaaag	ccgcaataag	aatagcaatg	atatatacat	12420
gggcatttgg	taatgatgag	atatcttgg	tggaagcctc	acagatagca	caaacacgtg	12480
caaattttac	actagatagt	ctcaaaattt	taacaccggt	agctacatca	acaaatttat	12540
cacacagatt	aaaggatact	gcaactcaga	tgaaattctc	cagtacatca	ttgatcagag	12600
tcagcagatt	cataacaatg	tccaatgata	acatgtctat	caaagaagct	aatgaaacca	12660
aagatactaa	tcttattttat	caacaaataa	tgttaacagg	attaagtgtt	ttcgaatatt	12720
tatttagatt	aaaagaaacc	acaggacaca	accctatagt	tatgcatctg	cacatagaag	12780
atgagtgttg	tattaaagaa	agttttaatg	atgaacatat	taatccagag	tctacattag	12840
aattaattcg	atatcctgaa	agtaatgaat	ttattttatga	taaagacca	ctcaaagatg	12900
tggacttatc	aaaacttatg	gttattaaag	accattctta	cacaattgat	atgaattatt	12960
gggatgatac	tgacatcata	catgcaattt	caatatgtac	tgcaattaca	atagcagata	13020
ctatgtcaca	attagatcga	gataatttaa	aagagataat	agttattgca	aatgatgatg	13080
atattaatag	cttaatcact	gaatttttga	ctcttgacat	acttgtattt	ctcaagacat	13140
ttggtggatt	attagtaaat	caatttgc	acactcttta	tagtctaaaa	atagaaggta	13200
gggatctcat	ttgggattat	ataatgagaa	cactgagaga	tacttcccat	tcaatattaa	13260
aagtattatc	taatgcatta	tctcatccta	aagtattcaa	gaggttctgg	gattgtggag	13320
ttttaaaccc	tatttatggt	cctaatactg	ctagtcaaga	ccagataaaa	cttgccctat	13380
ctatatgtga	atattcacta	gatctattta	tgagagaatg	gttgaatgg	gtatcacttg	13440
aaatatacat	ttgtgacagc	gatatggaag	ttgcaaatga	taggaaacaa	gcctttattt	13500
ctagacacct	ttcatttgtt	tggtgttttag	cagaaattgc	atctttcgga	cctaacctgt	13560
taaacttaac	atacttggag	agacttgatc	tattgaaaca	atatcttgaa	ttaaatatta	13620
aagaagaccc	tactcttaaa	tatgtacaaa	tatctggatt	attaattaaa	tcgttcccat	13680
caactgtaac	atacgtaaga	aagactgcaa	tcaaatatct	aaggattcgc	ggtattagtc	13740
cacctgaggt	aattgatgat	tgggatccgg	tagaagatga	aaatatgctg	gataacattg	13800
tcaaaactat	aaatgataac	tgtaataaag	ataataaagg	gaataaaatt	aacaatttct	13860
ggggactagc	acttaagaac	tatcaagtcc	ttaaaatcag	atctataaca	agtgattctg	13920
atgataatga	tagactagat	gctaatacaa	gtggtttgac	acttctctca	ggagggaatt	13980
atctatcgca	tcaattgaga	ttattcggaa	tcaacagcac	tagttgtctg	aaagctcttg	14040
agttatcaca	aattttaatg	aaggaagtca	ataaagacaa	ggacaggctc	ttcctgggag	14100
aaggagcagg	agctatgcta	gcatgttatg	atgccacatt	aggacctgca	gttaattatt	14160
ataattcagg	tttgaatata	acagatgtaa	ttggtcaacg	agaattgaaa	atatttcctt	14220
cagaggtatc	attagtaggt	aaaaaattag	gaaatgtgac	acagattctt	aacagggtaa	14280

```

aagtactgtt caatgggaat cctaattcaa catggatagg aaatatggaa tgtgagagct 14340
taatatggag tgaattaaat gataagtcca ttggattagt acattgtgat atggaaggag 14400
ctatcggtaa atcagaagaa actgttctac atgaacatta tagtggtata agaattacat 14460
acttgattgg ggatgatgat gttgttttag ttccaaaat tatakctaca atcactccga 14520
attggtctag aatactttat ctatataaat tatattggaa agatgtaagt ataatatcac 14580
tcaaaacttc taatcctgca tcaacagaat tataatctaat ttcgaaagat gcatattgta 14640
ctataatgga acctagtga attgttttat caaaacttaa aagattgtca ctcttggaag 14700
aaaataatct attaaaatgg atcattttat caaagaagag gaataatgaa tggttacatc 14760
atgaaatcaa agaaggagaa agagattatg gaatcatgag accatatcat atggcactac 14820
aaatcttttg atttcaaact aatttaaact atctggcgaa agaattttta tcaaccccag 14880
atctgactaa tatcaacaat ataatccaaa gttttcagcg aacaataaag gatgttttat 14940
ttgaatggat taatataact catgatgata agagacataa attaggcgga agatataaca 15000
tattccact gaaaaataag ggaaagttaa gactgctatc gagaagacta gtattaagtt 15060
ggatttcatt atcattatcg actcgattac ttacagggtcg ctttcctgat gaaaaatttg 15120
aacatagagc acagactgga tatgtatcat tagctgatac tgatttagaa tcattaaagt 15180
tattgtcgaa aaacatcatt aagaattaca gagagtgtat aggatcaata tcatattggt 15240
ttctaaccba agaagttaaa atacttatga aattgatcgg tgggtgctaaa ttattaggaa 15300
ttccagaca atataaagaa cccgaagacc agttattaga aaactacaat caacatgatg 15360
aatttgatat cgattaaaac ataaatacaa tgaagatata tcctaacctt tatctttaag 15420
cctaggaata gacaaaaagt aagaaaaaca tgtaatatat atataccaaa cagagttctt 15480
ctcttgtttg gt 15492

```

<210> 20

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV2 F (sense).

<400> 20

gtaccatgga tcacctgcat ccaat

25

<210> 21

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV2 F (antisense).

<400> 21

tgtggatcct aagatatccc atatatgttt c

31

<210> 22  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV2 F  
(sense).

<400> 22  
atgcatcacc tgcaccaat

20

<210> 23  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV2  
(antisense).

<400> 23  
tagtgaataa agtgtcttgg ct

22

<210> 24  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV2 HN  
(sense).

<400> 24  
catgagataa ttcattctga tggt

24

<210> 25  
<211> 24  
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV2 HN (antisense).

<400> 25

agcttaaagc attagttccc ttaa

24

<210> 26

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV3 F (sense).

<400> 26

atcataatta ttttgataat gatcatta

28

<210> 27

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV3 F (antisense).

<400> 27

gttcagtgct tgttgtgtt

19

<210> 28

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV3 HN (sense/antisense).

<400> 28  
tcataattaa ccataatatg catcaat

27

<210> 29  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV3 HN  
(sense).

<400> 29  
gatggaatta attagcacta tgat

24

<210> 30  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV2 F  
(antisense).

<400> 30  
atgcatcacc tgcattcaat

20

<210> 31  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV2 F  
(sense).

<400> 31  
gatgatgtag gcaatcagc

19

<210> 32

<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV2 HN (sense).

<400> 32  
actgccacaa ttcttggc

18

<210> 33  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV2 HN (antisense).

<400> 33  
ttaaagcatt agttccctta aaaatg

26

<210> 34  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for construction of PIV3-2 chimeric cDNAs, PIV3 F (sense).

<400> 34  
aagtattaca gaattcaaaa gag

23

<210> 35  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for



construction of PIV3-2 chimeric cDNAs, PIV3 HN  
(antisense).

<400> 35

cttattagtg agcttggtgc

20

<210> 36

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV2 F  
(sense).

<400> 36

accgcagctg tagcaatagt

20

<210> 37

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV2 HN  
(antisense).

<400> 37

gattccatca cttaggtaaa t

21

<210> 38

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for  
construction of PIV3-2 chimeric cDNAs, PIV3 M  
(sense).

<400> 38

gatactatcc taatattatt gc

22

<210> 39  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer for  
 construction of PIV3-2 chimeric cDNAs, PIV3 L  
 (antisense).

<400> 39  
 gctaattttg atagcacatt

20

<210> 40  
 <211> 15498  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Sequence of  
 pFLC.PIV32TM, 15498 bp in sense orientation.

<400> 40  
 accaaacaag agaagaaact tgtctgggaa tataaattta acttttaaatt aacttaggat 60  
 taaagacatt gactagaagg tcaagaaaag ggaactctat aatttcaaaa atgttgagcc 120  
 tatttgatac atttaatgca cgtaggcaag aaaacataac aaaatcagcc ggtggagcta 180  
 tcattcctgg acagaaaaat actgtctcta ttttcgcct tggaccgaca ataactgatg 240  
 ataatgagaa aatgacatta gctcttctat ttctatctca ttactagat aatgagaaac 300  
 aacatgcaca aagggcgagg ttcttggtgt ctttattgtc aatggcttat gccaatccag 360  
 agctctacct aacaacaaat ggaagtaatg cagatgtcaa gtatgtcata tacatgattg 420  
 agaaagatct aaaacggcaa aagtatggag gatttgtggt taagacgaga gagatgatat 480  
 atgaaaagac aactgattgg atatttggaa gtgacctgga ttatgatcag gaaactatgt 540  
 tgcagaacgg caggaacaat tcaacaattg aagacctgtt ccacacattt gggatatccat 600  
 catgttttagg agctcttata atacagatct ggatagttct ggtcaaagct atcactagta 660  
 tctcaggggt aagaaaaggc tttttcaccc gattggaagc tttcagacaa gatggaacag 720  
 tgcaggcagg gctggtattg agcggtgaca cagtggatca gattgggtca atcatgcgg 780  
 ctcaacagag cttggttaact cttatggttg aaacattaat aacaatgaat accagcagaa 840  
 atgacctcac aaccatagaa aagaatatac aaattgttgg caactacata agagatgcag 900  
 gtctcgcttc attcttcaat acaatcagat atggaattga gaccagaatg gcagctttga 960  
 ctctatccac tctcagacca gatataata gattaaaagc tttgatggaa ctgtatttat 1020  
 caaaggggacc acgcgtctct ttcattctgta tctcagaga tctatacat ggtgagttcg 1080  
 caccaggcaa ctatcctgcc atatggagct atgcaatggg ggtggcagtt gtacaaaata 1140  
 gagccatgca acagtatgtg acgggaagat catatctaga cattgatatg ttccagctag 1200  
 gacaagcagt agcacgtgat gccgaagctc aaatgagctc aacactggaa gatgaacttg 1260  
 gagtgcaca cgaatctaaa gaaagcttga agagacatat aaggaacata aacagttcag 1320  
 agacatcttt ccacaaaccg acaggtggat cagccataga gatggcaata gatgaagagc 1380

cagaacaatt	cgaacataga	gcagatcaag	aacaaaatgg	agaacctcaa	tcatccataa	1440
ttcaatatgc	ctgggcagaa	ggaaatagaa	gcgatgatca	gactgagcaa	gctacagaat	1500
ctgacaatat	caagaccgaa	caacaaaaca	tcagagacag	actaaacaag	agactcaacg	1560
acaagaagaa	acaaagcagt	caaccaccca	ctaataccac	aaacagaaca	aaccaggacg	1620
aaatagatga	tctgtttaac	gcattttgaa	gcaactaatc	gaatcaacat	tttaatctaa	1680
atcaataata	aataagaaaa	acttaggatt	aaagaatcct	atcataccgg	aatatagggt	1740
ggtaaattta	gagtcctgct	gaaactcaat	caatagagag	ttgatggaaa	gcgatgctaa	1800
aaactatcaa	atcatggatt	cttgggaaga	ggaatcaaga	gataaatcaa	ctaatatctc	1860
ctcgccctc	aacatcattg	aattcatact	cagcacccgac	ccccagaag	acttatcgga	1920
aaacgacaca	atcaacacaa	gaaccacagca	actcagtgcc	accatctgtc	aaccagaaat	1980
caaaccaaca	gaaacaagtg	agaaagatag	tggatcaact	gacaaaaata	gacagtccgg	2040
gtcatcacac	gaatgtacaa	cagaagcaaa	agatagaaat	attgatcagg	aaactgtaca	2100
gagaggacct	gggagaagaa	gcagctcaga	tagtagagct	gagactgtgg	tctctggagg	2160
aatccccaga	agcatcacag	attctaaaaa	tggaaaccaa	aacacggagg	atattgatct	2220
caatgaaatt	agaaagatgg	ataaggactc	tattgagggg	aaaatgcgac	aatctgcaaa	2280
tgttccaagc	gagatatcag	gaagtgatga	catatttaca	acagaacaaa	gtagaaacag	2340
tgatcatgga	agaagcctgg	aatctatcag	tacacctgat	acaagatcaa	taagtgttgt	2400
tactgctgca	acaccagatg	atgaagaaga	aataactaatg	aaaaatagta	ggacaaagaa	2460
aagttcttca	acacatcaag	aagatgacaa	aagaattaaa	aaagggggaa	aagggaaaga	2520
ctggtttaag	aaatcaaaaag	ataccgacaa	ccagatacca	acatcagact	acagatccac	2580
atcaaaaagg	cagaagaaaa	tctcaaagac	aacaaccacc	aacaccgaca	caaaggggca	2640
aacagaaata	cagacagaat	catcagaaac	acaatcctca	tcatggaatc	tcatcatcga	2700
caacaacacc	gaccggaacg	aacagacaag	cacaactcct	ccaacaacaa	cttccagatc	2760
aacttataca	aaagaatcga	tccgaacaaa	ctctgaatcc	aaaccaaga	cacaaaagac	2820
aatggaaag	gaaaggaagg	atacagaaga	gagcaatcga	tttacagaga	gggcaattac	2880
tctattgcag	aatcttggtg	taattcaatc	cacatcaaaa	ctagatttat	atcaagacaa	2940
acgagttgta	tgtgtagcaa	atgtactaaa	caatgtagat	actgcatcaa	agatagattt	3000
cctggcagga	ttagtcatag	gggtttcaat	ggacaacgac	acaaaattaa	cacagatata	3060
aatgaaatg	ctaaacctca	aagcagatct	aaagaaaatg	gacgaatcac	atagaagatt	3120
gatagaaaat	caaagagaac	aactgtcatt	gatcaogtca	ctaatttcaa	atctcaaaat	3180
tatgactgag	agaggaggaa	agaaagacca	aatgaatcc	aatgagagag	tatccatgat	3240
caaaacaaaa	ttgaaagaag	aaaagatcaa	gaagaccagg	tttgaccac	ttatggaggc	3300
acaaggcatt	gacaagaata	taccgatct	atatcgacat	gcaggagata	cactagagaa	3360
cgatgtacaa	gttaaatacag	agatattaag	ttcatacaat	gagtcaaata	caacaagact	3420
aatacccaaa	aaagtggagca	gtacaatgag	atcactagtt	gcagtcatca	acaacagcaa	3480
tctctcacia	agcacaaaac	aatcatacat	aaacgaactc	aaacgttgca	aaaatgatga	3540
agaagtatct	gaattaatgg	acatgttcaa	tgaagatgtc	aacaattgcc	aatgatccaa	3600
caaagaaacg	acaccgaaca	aacagacaag	aaacaacagt	agatcaaaac	ctgtcaaacac	3660
acacaaaatc	aagcagaatg	aaacaacaga	tatcaatcaa	tatacaata	agaaaaactt	3720
aggattaaag	aataaaattaa	tccttgtcca	aatgagtat	aactaactct	gcaatataca	3780
cattcccaga	atcatcattc	tctgaaaatg	gtcatataga	accattacca	ctcaaagtca	3840
atgaacagag	gaaagcagta	ccccacatta	gagttgccaa	gatcggaaat	ccacccaaaac	3900
acggatcccc	gtatttagat	gtcttcttac	tcggcttctt	cgagatggaa	cgaatcaaag	3960
acaaatacgg	gagtgatgaat	gatctcgaca	gtgaccocgag	ttacaaagtt	tgtggctctg	4020
gatcattacc	aatcggattg	gctaagtaca	ctgggaatga	ccaggaattg	ttacaagccg	4080
caaccaaact	ggatatagaa	gtgagaagaa	cagtcaaagc	gaaagagatg	gttggtttaca	4140
cggatcaaaa	tataaaacca	gaactgtacc	catggtccaa	tagactaaga	aaaggaatgc	4200
tgttcgatgc	caacaaagtt	gctcttgctc	ctcaatgtct	tccactagat	aggagcataa	4260

aatttagagt	aatcttcgtg	aattgtacgg	caattggatc	aataaccttg	ttcaaaattc	4320
ctaagtcaat	ggcatcacta	tctctaccca	acacaatatc	aatcaatctg	cagggtacaca	4380
taaaaacagg	ggttcagact	gattctaaag	ggatagttca	aattttggat	gagaaaggcg	4440
aaaaatcact	gaatttcacg	gtccatctcg	gattgatcaa	aagaaaagta	ggcagaatgt	4500
actctgttga	atactgtaaa	cagaaaatcg	agaaaatgag	attgatattt	tctttaggac	4560
tagttggagg	aatcagtcct	catgtcaatg	caactgggtc	catatcaaaa	acactagcaa	4620
gtcagctggg	attcaaaaaga	gagatttggt	atcctttaat	ggatctaaat	cgcacatctca	4680
atctagttat	ctgggcttca	tcagtagaga	ttacaagagt	ggatgcaatt	ttccaacctt	4740
ctttacctgg	cgagttcaga	tactatccta	atattattgc	aaaaggagtt	gggaaaatca	4800
aacaatggaa	ctagtaatct	ctatttttagt	ccggacgtat	ctattaagcc	gaagcaaata	4860
aaggataatc	aaaaaacttag	gacaaaagag	gtcaatacca	acaactatta	gcagtcacac	4920
tcgcaagaat	aagagagaag	ggaccaaaaa	agtcaaatag	gagaaatcaa	aacaaaagggt	4980
acagaacacc	agaacaacaa	aatcaaaaaca	tccaactcac	tcaaaacaaa	aattccaaaa	5040
gagaccggca	acacaacaag	cactgaacat	gcatacctg	catccaatga	tagtatgcat	5100
ttttgttatg	tacactggaa	ttgtagggtc	agatgccatt	gctggagatc	aactcctcaa	5160
tgtagggggtc	attcaatcaa	agataagatc	actcatgtac	tacactgatg	gtggcgctag	5220
ctttattgtt	gtaaaattac	taccaaatct	ttccccaagc	aatggaacat	gcaacatcac	5280
cagtctagat	gcataataatg	ttacctatt	taagttgcta	acacctga	ttgagaacct	5340
gagcaaaatt	tctgctgtta	cagataccaa	acccgcgcga	gaacgatttg	caggagtcgt	5400
tattgggctt	gctgcactag	gagtagctac	agctgcacaa	ataaccgcag	ctgtagcaat	5460
agtaaaagcc	aatgcaaatg	ctgctgcgat	aaacaatctt	gcattctcaa	ttcaatccac	5520
caacaaggca	gtatccgatg	tgataactgc	atcaagaaca	attgcaaccg	cagttcaagc	5580
gattcaggat	cacatcaatg	gagccattgt	caacgggata	acatctgcat	catgccgtgc	5640
ccatgatgca	ctaattgggt	caatattaaa	tttgtatctc	actgagctta	ctacaatatt	5700
tcataatcaa	ataacaaacc	ctgcgctgac	accactttcc	atccaagctt	taagaatcct	5760
cctcggtagc	accttgccaa	ttgtcattga	atccaaactc	aacacaaaac	tcaacacagc	5820
agagctgctc	agtagcggac	tgttaactgg	tcaataatt	tccatttccc	caatgtacat	5880
gcaaatgcta	attcaaatca	atgttccgac	atttataatg	caaccgggtg	cgaaggtaat	5940
tgatctaatt	gctatctctg	caaaccataa	attacaagaa	gtagttgtac	aagttcctaa	6000
tagaattcta	gaatatgcaa	atgaactaca	aaactaccca	gccaatgatt	gtttcgtgac	6060
accaaactct	gtattttgta	gatacaatga	gggttccccg	atccctgaat	cacaatatca	6120
atgcttaagg	gggaatctta	attcttgcac	ttttaccctt	attatcgggg	actttctcaa	6180
gcgattcgca	tttgccaatg	gtgtgctcta	tgccaactgc	aatcttttgc	tatgtaagtg	6240
tgccgacctt	ccccatgttg	tgtctcaaga	tgacaaccaa	ggcatcagca	taattgatat	6300
taagagggtg	tctgagatga	tgcttgacac	tttttcattt	aggatcacat	ctacattcaa	6360
tgctacatac	gtgacagact	tctcaatgat	taatgcaaat	attgtacatc	taagtccctc	6420
agacttgctc	aatcaaatca	attcaataaa	caaatctctt	aaaagtgctg	aggattggat	6480
tgcagatagc	aacttcttcg	ctaatacagc	cagaacagcc	aagacacttt	attcactaat	6540
cataattatt	ttgataatga	tcatttatatt	gtttataatt	aatataacga	taattacaat	6600
tgcaattaag	tattacagaa	ttcaaaagag	aaatcgagtg	gatcaaaatg	acaagccata	6660
tgtactaaca	aacaaataac	atatctacag	atcattagat	attaaaatta	taaaaaactt	6720
aggagtaaag	ttacgcaatc	caactctact	catataattg	aggaaggacc	caatagacaa	6780
atccaaatc	gagatggaat	actggaagca	taccaatcac	ggaaaggatg	ctggtaatga	6840
gctggagacg	tctatggcta	ctcatggcaa	caagctcact	aataagataa	tatacatatt	6900
atggacaata	atcctgggtg	tattatcaat	agtcttcac	atagtgtctaa	ttaattccat	6960
ccatgagata	attcatcttg	atgtttcctc	tggtcttatg	aattctgatg	agtcacagca	7020
aggcattatt	cagcctatca	tagaatcatt	aaaatcattg	attgctttgg	ccaaccagat	7080
tctatataat	gttgcaatag	taattcctct	taaaattgac	agtatcgaaa	ctgtaatact	7140

ctctgcttta	aaagatatgc	acaccgggag	tatgtccaat	gccaaactgca	cgccaggaaa	7200
tctgcttctg	catgatgcag	catacatcaa	tggataaaac	aaattccttg	tacttgaatc	7260
atacaatggg	acgcctaaat	atggacctct	cctaaatata	cccagcttta	ccccctcagc	7320
aacatctccc	catgggtgta	ctagaatacc	atcattttca	ctcatcaaga	cccattgggtg	7380
ttacactcac	aatgtaatgc	ttggagattg	tcttgatttc	acggcatcta	accagtattt	7440
atcaatgggg	ataatacaac	aatctgctgc	agggtttcca	attttcagga	ctatgaaaac	7500
catttaccta	agtgatggaa	tcaatcgcaa	aagctgttca	gtcactgcta	taccaggagg	7560
ttgtgtcttg	tattgctatg	tagctacaag	gtctgaaaaa	gaagattatg	ccacgactga	7620
tctagctgaa	ctgagacttg	ctttctatta	ttataatgat	acctttattg	aaagagtcac	7680
atctcttcca	aatacaacag	ggcagtgggc	cacaatcaac	cctgcagtcg	gaagcgggat	7740
ctatcatcta	ggcttttatct	tatttcctgt	atatgggtgg	ctcataaatg	ggactacttc	7800
ttacaatgag	cagtcctcac	gctattttat	cccaaacat	cccaacataa	cttgtgccgg	7860
taactccagc	aaacaggctg	caatagcacg	gagttcctat	gtcatccgtt	atcactcaaa	7920
caggttaatt	cagagtgtcg	ttcttatttg	tccattgtct	gacatgcata	cagaagagtg	7980
taatctagtt	atgtttaaca	attcccaagt	catgatgggt	gcagaaggta	ggctctatgt	8040
tattggtaat	aatttgattt	attatcaacg	cagttcctct	tgggtggtctg	catcgctctt	8100
ttacaggatc	aatacagatt	tttctaaagg	aattcctccg	atcattgagg	ctcaatgggt	8160
accgtcctat	caagttcctc	gtcctggagt	catgccatgc	aatgcaacaa	gtttttgccc	8220
tgtcaattgc	atcacagggg	tgtacgcaga	tgtgtggccg	cttaatgatc	cagaactcat	8280
gtcacgtaat	gctctgaacc	ccaactatcg	atttgctgga	gcctttctca	aaaatgagtc	8340
caaccgaact	aatcccatat	tctacactgc	atcggctaac	tccctcttaa	atactaccgg	8400
attcaacaac	accaatcaca	aagcagcata	tacatcttca	acctgcttta	aaaacactgg	8460
aacccaaaaa	atattattgt	taataataat	tgaaatgggc	tcattctctt	taggggagtt	8520
ccaaataata	ccatttttaa	gggaactaat	gctttaagct	tcataattaa	ccataatatg	8580
catcaatcta	tctataatac	aagtatatga	taagtaatca	gcaatcagac	aatagacaaa	8640
agggaaatat	aaaaaactta	ggagcaaagc	gtgctcggga	aatggacact	gaatctaaca	8700
atggcactgt	atctgacata	ctctatcctg	agtgtcacct	taactctcct	atcgttaaag	8760
gtaaaatagc	acaattacac	actattatga	gtctacctca	gccttatgat	atggatgacg	8820
actcaatact	agttatcact	agacagaaaa	taaaacttaa	taaattggat	aaaagacaac	8880
gatctattag	aagattaaaa	ttaatatata	ctgaaaaagt	gaatgactta	ggaaaatata	8940
catttatcag	atatccagaa	atgtcaaaa	aaatgttcaa	attatatata	cctgggtatta	9000
acagtaaagt	gactgaatta	ttacttaaag	cagatagaac	atatagtcaa	atgactgatg	9060
gattaagaga	tctatggatt	aatgtgctat	caaaattagc	ctcaaaaaat	gatggaagca	9120
attatgatct	taatgaagaa	attaataata	tatcgaaagt	tcacacaacc	tataaatcag	9180
ataaatggta	taatccattc	aaaacatggg	ttactatcaa	gtatgatatg	agaagattac	9240
aaaaagctcg	aatgagatc	acttttaaat	ttgggaagga	ttataacttg	ttagaagacc	9300
agaagaattt	cttattgata	catccagaat	tggttttgat	attagataaa	caaaactata	9360
atgggttatct	aattactcct	gaattagtat	tgatgtattg	tgacgtagtc	gaaggccgat	9420
ggaatataag	tgcattgtgt	aagttagatc	caaaattaca	atctatgtat	cagaaaggta	9480
ataacctgtg	ggaagtgata	gataaattgt	ttccaattat	gggagaaaag	acatttgatg	9540
tgatatcggt	attagaacca	cttgcatatt	ccttaattca	aactcatgat	cctgttaaac	9600
aactaagagg	agctttttta	aatcatgtgt	tatccgagat	ggaattaata	tttgaatcta	9660
gagaatcgat	taaggaattt	ctgagtgtag	attacattga	taaaatttta	gatataattta	9720
ataagtctac	aatagatgaa	atagcagaga	ttttctcttt	ttttagaaca	tttgggcata	9780
ctccattaga	agctagtatt	gcagcagaaa	aggttagaaa	atatatgtat	attggaaaac	9840
aattaaaaatt	tgacactatt	aataaatgtc	atgctatctt	ctgtacaata	ataattaacg	9900
gatatagaga	gaggcatggg	ggacagtggc	ctcctgtgac	attacctgat	catgcacacg	9960
aattcatcat	aaatgcttac	ggttcaaact	ctgcgatatc	atatgaaaat	gctgttgatt	10020

attaccagag	ctttatagga	ataaaattca	ataaattcat	agagcctcag	ttagatgagg	10080
atttgacaat	ttatatgaaa	gataaagcat	tatctccaaa	aaaatcaaat	tgggacacag	10140
tttatcctgc	atctaattta	ctgtaccgta	ctaacgcata	caacgaatca	cgaagattag	10200
ttgaagtatt	tatagcagat	agtaaatttg	atcctcatca	gatattggat	tatgtagaat	10260
ctggggactg	gttagatgat	ccagaattta	atattttctta	tagtcttaaa	gaaaaagaga	10320
tcaaacagga	aggtagactc	tttgcaaaaa	tgacatacaa	aatgagagct	acacaagttt	10380
tatcagagac	cctacttgca	aataacatag	gaaaattcct	tcaagaaaat	gggatgggtga	10440
agggagagat	tgaattactt	aagagattaa	caaccatata	aatatcagga	gttccacggg	10500
ataatgaagt	gtacaataat	tctaaaagcc	atacagatga	ccttaaaacc	tacaataaaa	10560
taagtaatct	taattttgtct	tctaatacaga	aatcaaagaa	atttgaattc	aagtcaacgg	10620
atatctacaa	tgatggatag	gagactgtga	gctgtttcct	aacaacagat	ctcaaaaaat	10680
actgtcttaa	ttggagatat	gaatcaacag	ctctattttgg	agaaacttgc	aaccaaatat	10740
ttggattaaa	taaattgttt	aattgggttac	accctcgtct	tgaaggaagt	acaatctatg	10800
taggtgatcc	ttactgtcct	ccatcagata	aagaacatat	atcattagag	gatcaccttg	10860
attctggttt	ttacgttcat	aaccaagag	ggggtataga	aggattttgt	caaaaattat	10920
ggacactcat	atctataagt	gcaatacatc	tagcagctgt	tagaataggc	gtgaggggtga	10980
ctgcaatggg	tcaaggagac	aatcaagcta	tagctgtaac	cacaagagta	cccaacaatt	11040
atgactacag	agttaagaag	gagatagttt	ataaagatgt	agtgagattt	tttgattcat	11100
taagagaagt	gatggatgat	ctaggtcatg	aacttaaatt	aatgaaacg	attataagta	11160
gcaagatgtt	catatatagc	aaaagaatct	attatgatgg	gagaattcct	cctcaagctc	11220
taaaagcatt	atctagatgt	gtcttctggg	cagagacagt	aatagacgaa	acaagatcag	11280
catcttcaaa	tttggcaaca	tcatttgcaa	aagcaattga	gaatggttat	tcacctgttc	11340
taggatatgc	atgctcaatt	tttaagaata	ttcaacaact	atatattgcc	cttgggatga	11400
atatcaatcc	aactataaca	cagaatatca	gagatcagta	ttttaggaat	ccaaattgga	11460
tgcaatatgc	ctctttaata	cctgctagt	ttgggggatt	caattacatg	gccatgtcaa	11520
gatgttttgt	aaggaatatt	ggtgatccat	cagttgccgc	attggctgat	attaaaagat	11580
ttattaaggc	gaatctatta	gaccgaagt	ttctttatag	gattatgaat	caagaaccag	11640
gtgagtcata	ttttttggac	tgggcttcag	atccatattc	atgcaattta	ccacaatctc	11700
aaaatataac	caccatgata	aaaaatataa	cagcaaggaa	tgtattacaa	gattcaccaa	11760
atocattatt	atctggatta	ttcacaaata	caatgataga	agaagatgaa	gaattagctg	11820
agttcctgat	ggacaggaag	gtaattctcc	ctagagttgc	acatgatatt	ctagataatt	11880
ctctcacagg	aattagaaat	gccatagctg	gaatgttaga	tacgacaaaa	tcactaattc	11940
gggttggcat	aaatagagga	ggactgacat	atagtttgtt	gaggaaaatc	agtaattacg	12000
atctagtaca	atatgaaaca	ctaagtagga	ctttgcgact	aattgtaagt	gataaaatca	12060
agtatgaaga	tatgtgttcg	gtagaccttg	ccatagcatt	gcgacaaaag	atgtggattc	12120
atztatcagg	aggaaggatg	ataagtggac	ttgaaacgcc	tgaccatta	gaattactat	12180
ctggggtagt	aataacagga	tcagaacatt	gtaaaatatg	ttattcttca	gatggcacia	12240
acccatatac	ttggatgtat	ttaccgggta	atatcaaaat	aggatcagca	gaaacaggta	12300
tatcgtcatt	aagagttcct	tattttggat	cagtcactga	tgaaagatct	gaagcacaat	12360
taggatatat	caagaatctt	agtaaacctg	caaaagccgc	aataagaata	gcaatgatat	12420
atacatgggc	atttggtaat	gatgagatat	cttggatgga	agcctcacag	atagcacaaa	12480
cacgtgcaaa	ttttacacta	gatagtctca	aaattttaac	accggtagct	acatcaacaa	12540
atztatcaca	cagattaaag	gatactgcaa	ctcagatgaa	attctccagt	acatcattga	12600
tcagagtcag	cagattcata	acaatgtcca	atgataacat	gtctatcaaa	gaagctaattg	12660
aaaccaaaga	tactaatctt	atztatcaac	aaataatggt	aacaggatta	agtgttttcg	12720
aatatattatt	tagattaaaa	gaaaccacag	gacacaaccc	tatagttatg	catctgcaca	12780
tagaagatga	gtgttgat	aaagaaagtt	ttaatgatga	acatattaat	ccagagtcta	12840
cattagaatt	aattcgatat	cctgaaagta	atgaatttat	ttatgataaa	gaccactca	12900

aagatgtgga	cttatcaaaa	cttatgggta	ttaaagacca	ttcttacaca	attgatatga	12960
attattggga	tgatactgac	atcatacatg	caatttcaat	atgtactgca	attacaatag	13020
cagatactat	gtcacaatta	gatcgagata	attttaaaga	gataatagtt	attgcaaattg	13080
atgatgatat	taatagctta	atcactgaat	ttttgactct	tgacatactt	gtattttctca	13140
agacatttgg	tggattatta	gtaaatcaat	ttgcatacac	tctttatagt	ctaaaaatag	13200
aaggtaggga	tctcatttgg	gattatataa	tgagaacact	gagagatact	tcccatcca	13260
tattaaaagt	attatcta	gcattatctc	atcctaaagt	attcaagagg	ttctgggatt	13320
gtggagtttt	aaaccctatt	tatggctcta	atactgctag	tcaagaccag	ataaaaacttg	13380
ccctatctat	atgtgaatat	tcactagatc	tatttatgag	agaatgggtg	aatgggtgat	13440
cacttgaaat	atacatttgt	gacagcgata	tggaagttgc	aatgatagg	aaacaagcct	13500
ttattttctag	acacctttca	tttgtttggt	gttttagcaga	aattgcatct	ttcggacctta	13560
acctgttaaa	cttaacatac	ttggagagac	ttgatctatt	gaaacaatat	cttgaattaa	13620
atattaaaga	agaccctact	cttaaataatg	tacaaatata	tggattatta	attaaatcgt	13680
tcccatcaac	tgtaacatac	gtaagaaaga	ctgcaatcaa	atatctaagg	attcgcggtta	13740
ttagtccacc	tgaggtaatt	gatgattggg	atccggtaga	agatgaaaat	atgctggata	13800
acattgtcaa	aactataaat	gataactgta	ataaagataa	taaagggaat	aaaattaaca	13860
atttctgggg	actagcactt	aagaactatc	aagtccttaa	aatcagatct	ataacaagtg	13920
attctgatga	taatgataga	ctagatgcta	atacaagtgg	tttgacactt	cctcaaggag	13980
ggaattatct	atcgcatcaa	ttgagattat	tcggaatcaa	cagcactagt	tgtctgaaag	14040
ctcttgagtt	atcacaaatt	ttaatgaagg	aagtcaataa	agacaaggac	aggctcttcc	14100
tgggagaagg	agcaggagct	atgctagcat	gttatgatgc	cacattagga	cctgcagtta	14160
attattataa	ttcaggtttg	aatataacag	atgtaattgg	tcaacgagaa	ttgaaaatat	14220
ttccttcaga	ggtatcatta	gtaggtaaaa	aattaggaaa	tgtgacacag	attcttaaca	14280
gggtaaaagt	actgttcaat	gggaatccta	attcaacatg	gataggaaat	atggaatgtg	14340
agagcttaat	atggagtga	ttaaatgata	agtcatttgg	attagtacat	tgtgatatgg	14400
aaggagctat	cggtaaataca	gaagaaactg	ttctacatga	acattatagt	gttataagaa	14460
ttacatactt	gattggggat	gatgatgttg	tttttagtttc	caaaattata	cctacaatca	14520
ctccgaattg	gtctagaata	ctttatctat	ataaattata	ttggaaagat	gtaagtataa	14580
tatcactcaa	aacttcta	cctgcacaa	cagaattata	tctaatttcg	aaagatgcat	14640
attgtactat	aatggaacct	agtgaaattg	ttttatcaaa	acttaaaaga	ttgtcactct	14700
tggagaaaaa	taatctatta	aaatggatca	ttttatcaaa	gaagaggaat	aatgaatggg	14760
tacatcatga	aatcaaagaa	ggagaaagag	attatggaat	catgagacca	tatcatatgg	14820
cactacaaat	ctttggattt	caaatacaat	taaatcatct	ggcgaaagaa	tttttatcaa	14880
ccccagatct	gactaatatc	aacaatataa	tcctaaagttt	tcagcgaaca	ataaaggatg	14940
ttttatttga	atggattaat	ataactcatg	atgataagag	acataaatta	ggcggaagat	15000
ataacatatt	ccactgaaa	aataaggga	agttaagact	gctatcgaga	agactagtat	15060
taagttggat	ttcattatca	ttatcgactc	gattacttac	aggtcgcttt	cctgatgaaa	15120
aatttgaaca	tagagcacag	actggatatg	tatcattagc	tgatactgat	ttagaatcat	15180
taaagttatt	gtcgaaaaac	atcattaaga	attacagaga	gtgtatagga	tcaatatcat	15240
attggtttct	aaccaaagaa	gttaaaatac	ttatgaaatt	gatcggtggg	gctaaattat	15300
taggaattcc	cagacaatat	aaagaacccg	aagaccagtt	attagaaaac	tacaatcaac	15360
atgatgaatt	tgatatcgat	taaaacataa	atacaatgaa	gatatatcct	aacctttatc	15420
tttaagccta	ggaatagaca	aaaagtaaga	aaaacatgta	atatatatat	accaaacaga	15480
gttcttctct	tgtttggg					15498

<210> 41

<211> 15474

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Sequence of  
pFLC.PIV32CT, 15474 bp in sense orientation.

<400> 41

```
accaacaag agaagaaact tgtctgggaa tataaattta actttaaatt aacttaggat 60
taaagacatt gactagaagg tcaagaaaag ggaactctat aatttcaaaa atgttgagcc 120
tatttgatac atttaatgca cgtaggcaag aaaacataac aaaatcagcc ggtggagcta 180
tcattcctgg acagaaaaat actgtctcta tattgcctt tggaccgaca ataactgatg 240
ataatgagaa aatgacatta gctcttctat ttctatctca ttactagat aatgagaaac 300
aacatgcaca aagggcaggg ttcttgggtg ctttattgtc aatggcttat gccaatccag 360
agctctacct aacaacaaat ggaagtaatg cagatgtcaa gtatgtcata tacatgattg 420
agaaagatct aaaacggcaa aagtatggag gatttgtggg taagacgaga gagatgatat 480
atgaaaagac aactgattgg atatttggaa gtgacctgga ttatgatcag gaaactatgt 540
tgcagaacgg caggaacaat tcaacaattg aagacctgtt ccacacattt gggatatccat 600
catgtttagg agctcttata atacagatct ggatagttct ggtcaaagct atcactagta 660
tctcaggggt aagaaaaggc tttttcaccg gattggaagc tttcagacaa gatggaacag 720
tgcaggcagg gctgggtattg agcggtgaca cagtggatca gattgggtca atcatcggt 780
ctcaacagag cttggtaact cttatggttg aaacattaat aacaatgaat accagcagaa 840
atgacctcac aaccatagaa aagaatatac aaattgttgg caactacata agagatgcag 900
gtctcgcttc attcttcaat acaatcagat atggaattga gaccagaatg gcagctttga 960
ctctatccac tctcagacca gatatcaata gattaaaagc tttgatggaa ctgtatttat 1020
caaagggacc acgcgctcct ttcattctgta tctcagaga tctatacat ggtgagttcg 1080
caccaggcaa ctatcctgcc atatggagct atgcaatggg ggtggcagtt gtacaaaata 1140
gagccatgca acagtatgtg acgggaagat catatctaga cattgatatg ttccagctag 1200
gacaagcagt agcacgtgat gccgaagctc aaatgagctc aacactggaa gatgaacttg 1260
gagtgcacac cgaatctaaa gaaagcttga agagacatat aaggaacata aacagttcag 1320
agacatcttt ccacaaaccg acaggtggat cagccataga gatggcaata gatgaagagc 1380
cagaacaatt cgaacataga gcagatcaag aacaaaatgg agaacctca tcatccataa 1440
ttcaatatgc ctgggcagaa ggaaatagaa gcgatgatca gactgagcaa gctacagaat 1500
ctgacaatat caagaccgaa caacaaaaca tcagagacag actaaacaag agactcaacg 1560
acaagaagaa acaaagcagt caaccacca ctaatcccac aaacagaaca aaccaggacg 1620
aatagatga tctgtttaac gcatttggaa gcaactaatc gaatcaacat tttaatctaa 1680
atcaataata aataagaaaa acttaggatt aaagaatcct atcataccgg aatatagggg 1740
ggtaaattta gagtctgctt gaaactcaat caatagagag ttgatggaaa gcgatgctaa 1800
aaactatcaa atcatggatt cttgggaaga ggaatcaaga gataaatcaa ctaatatctc 1860
ctcgccctc aacatcattg aattcatact cagcaccgac cccaagaag acttatcgga 1920
aaacgcacac atcaacacaa gaaccagca actcagtgcc accatctgtc aaccagaaat 1980
caaaccaaca gaaacaagtg agaaagatag tggatcaact gacaaaaata gacagtccgg 2040
gtcatcacac gaatgtacaa cagaagcaaa agatagaaat attgatcagg aaactgtaca 2100
gagaggacct gggagaagaa gcagctcaga tagtagagct gagactgtgg tctctggagg 2160
aatccccaga agcatcacag attctaaaaa tggaacccaa aacacggagg atattgatct 2220
caatgaaatt agaaagatgg ataaggactc tattgagggg aaaatgcgac aatctgcaaa 2280
tgttccaagc gagatatcag gaagtgatga catatttaca acagaacaaa gtagaaacag 2340
tgatcatgga agaagcctgg aatctatcag tacacctgat acaagatcaa taagtgttgt 2400
```



tactgctgca	acaccagatg	atgaagaaga	aataactaatg	aaaaatagta	ggacaaagaa	2460
aagttcttca	acacatcaag	aagatgacaa	agaattaaa	aaagggggaa	aagggaaaga	2520
ctggtttaag	aaatcaaaaag	ataccgacaa	ccagatacca	acatcagact	acagatccac	2580
atcaaaaggg	cagaagaaaa	tctcaaagac	aacaaccacc	aacaccgaca	caaaggggca	2640
aacagaaata	cagacagaat	catcagaaac	acaatcctca	tcatggaatc	tcatcatcga	2700
caacaacacc	gaccggaacg	aacagacaag	cacaactcct	ccaacaacaa	cttcagatc	2760
aacttatata	aaagaatcga	tccgaacaaa	ctctgaatcc	aaaccaaga	cacaaaagac	2820
aatggaaag	gaaaggaagg	atacagaaga	gagcaatcga	tttacagaga	gggcaattac	2880
tctattgcag	aatcttgggtg	taattcaatc	cacatcaaaa	ctagatttat	atcaagacaa	2940
acgagtgtga	tgtgtagcaa	atgtactaaa	caatgtagat	actgcatcaa	agatagattt	3000
cctggcagga	ttagtcatag	gggttttcaat	ggacaacgac	acaaaattaa	cacagatata	3060
aatgaaatg	ctaaacctca	aagcagatct	aaagaaaatg	gacgaatcac	atagaagatt	3120
gatagaaaat	caaagagaac	aactgtcatt	gatcacgtca	ctaatttcaa	atctcaaaat	3180
tatgactgag	agaggaggaa	agaaagacca	aatgaatcc	aatgagagag	tatccatgat	3240
caaaacaaaa	ttgaaagaag	aaaagatcaa	gaagaccagg	tttgaccac	ttatggaggc	3300
acaaggcatt	gacaagaata	taccgatct	atatcgacat	gcaggagata	cactagagaa	3360
cgatgtacaa	gttaaatacag	agatattaag	ttcatacaat	gagtcaaata	caacaagact	3420
aatacccaaa	aaagtgaagca	gtacaatgag	atcactagtt	gcagtcatca	acaacagcaa	3480
tctctcacia	agcacaaaac	aatcatacat	aaacgaactc	aaacgttgca	aaaatgatga	3540
agaagtatct	gaattaatgg	acatgttcaa	tgaagatgtc	aacaattgcc	aatgatccaa	3600
caaagaaacg	acaccgaaca	aacagacaag	aaacaacagt	agatcaaaac	ctgtcaacac	3660
acacaaaatc	aagcagaatg	aaacaacaga	tatcaatcaa	tatacaata	agaaaaactt	3720
aggattaaag	aataaattaa	tccttgtcca	aatgagtat	aactaactct	gcaatataca	3780
cattcccaga	atcatcattc	tctgaaaatg	gtcatataga	accattacca	ctcaaagtca	3840
atgaacagag	gaaagcagta	ccccacatta	gagttgccaa	gatcggaat	ccacaaaac	3900
acggatcccg	gtatttagat	gtcttcttac	tcggcttctt	cgagatggaa	cgaatcaaag	3960
acaaatacgg	gagtgatgaat	gatctcgaca	gtgaccgag	ttacaaagtt	tgtggctctg	4020
gatcattacc	aatcgattg	gctaagtaca	ctgggaatga	ccaggaattg	ttacaagccg	4080
caaccaaact	ggatatagaa	gtgagaagaa	cagtcaaagc	gaaagagatg	gttgtttaca	4140
cgggtacaaa	tataaaacca	gaactgtacc	catgggtccaa	tagactaaga	aaaggaatgc	4200
tgttcgatgc	caacaaagtt	gctcttgctc	ctcaatgtct	tccactagat	aggagcataa	4260
aatttagagt	aatcttcgtg	aattgtacgg	caattggatc	aataaccttg	ttcaaaattc	4320
ctaagtcaat	ggcatcacta	tctctaccca	acacaatatc	aatcaatctg	caggtacaca	4380
taaaaacagg	ggttcagact	gattctaaag	ggatagttca	aattttggat	gagaaaggcg	4440
aaaaatcact	gaatttcatg	gtccatctcg	gattgatcaa	aagaaaagta	ggcagaatgt	4500
actctgttga	atactgtaaa	cagaaaatcg	agaaaatgag	attgatattt	tctttaggac	4560
tagttggagg	aatcagtctt	catgtcaatg	caactgggtc	catatcaaaa	acactagcaa	4620
gtcagctggg	attcaaaaga	gagatttgtt	atcctttaat	ggatctaaat	ccgcatctca	4680
atctagttat	ctgggcttca	tcagtagaga	ttacaagagt	ggatgcaatt	ttccaacctt	4740
ctttacctgg	cgagttcaga	tactatccta	atattattgc	aaaaggagtt	gggaaaatca	4800
aacaatggaa	ctagtaatct	ctatttttagt	ccggacgtat	ctattaagcc	gaagcaaata	4860
aaggataatc	aaaaacttag	gacaaaagag	gtcaatacca	acaactatta	gcagtcacac	4920
tcgcaagaat	aagagagaag	ggaccaaaaa	agtcaaatag	gagaaatcaa	aacaaaagg	4980
acagaacacc	agaacaacaa	aatcaaaaaca	tccaactcac	tcaaaaacaaa	aattccaaaa	5040
gagaccggca	acacaacaag	cactgaacat	gcatacctg	catccaatga	tagtatgcat	5100
ttttgttatg	tacactggaa	ttgtaggttc	agatgccatt	gctggagatc	aactcctcaa	5160
tgtaggggtc	attcaatcaa	agataagatc	actcatgtac	tacactgatg	gtggcgctag	5220
ctttattgtt	gtaaaattac	tacccaatct	tcccccaagc	aatggaacat	gcaacatcac	5280

cagtctagat	gcatataatg	ttaccctatt	taagttgcta	acacccctga	ttgagaacct	5340
gagcaaaatt	tctgctgtta	cagataccaa	accccgccga	gaacgatttg	caggagtcgt	5400
tattgggctt	gctgcactag	gagtagctac	agctgcacaa	ataaccgcag	ctgtagcaat	5460
agtaaaagcc	aatgcaaagc	ctgctgcgat	aaacaatctt	gcatcttcaa	ttcaatccac	5520
caacaaggca	gtatccgatg	tgataactgc	atcaagaaca	attgcaaccg	cagttcaagc	5580
gattcaggat	cacatcaatg	gagccattgt	caacgggata	acatctgcat	catgccgtgc	5640
ccatgatgca	ctaattgggt	caatattaaa	tttgtatctc	actgagctta	ctacaatatt	5700
tcataatcaa	ataacaaacc	ctgcgctgac	accactttcc	atccaagctt	taagaatcct	5760
cctcggtagc	accttgccaa	ttgtcattga	atccaaactc	aacacaaaac	tcaacacagc	5820
agagctgctc	agtagcggac	tgttaactgg	tcaaataatt	tccattttccc	caatgtacat	5880
gcaaagtcta	attcaaatca	atgttccgac	atttataatg	caaccgggtg	cgaaggtaat	5940
tgatctaatt	gctatctctg	caaaccataa	attacaagaa	gtagttgtac	aagttcctaa	6000
tagaattcta	gaatatgcaa	atgaactaca	aaactaccga	gccaatgatt	gtttcgtgac	6060
accaaactct	gtattttgta	gatacaatga	gggttccccg	atccctgaat	cacaatatca	6120
atgcttaagg	gggaatctta	attcttgcac	ttttaccctt	attatcggga	actttctcaa	6180
gcgattcgca	tttgccaatg	gtgtgctcta	tgccaactgc	aaatctttgc	tatgtaagtg	6240
tgccgacct	ccccatgttg	tgtctcaaga	tgacaaccaa	ggcatcagca	taattgatat	6300
taagagggtg	tctgagatga	tgcttgacac	tttttcattt	aggatcacat	ctacattcaa	6360
tgctacatac	gtgacagact	tctcaatgat	taatgcaaat	attgtacatc	taagtcctct	6420
agacttgtea	aatcaaatca	attcaataaa	caaactctct	aaaagtgtctg	aggattggat	6480
tgcatagatg	aacttcttcg	ctaatacagc	cagaacagcc	aagacacttt	attcactaag	6540
tgcaatcgca	ttaatactat	cagtgattac	tttggttggt	gtgggattgc	tgattgccta	6600
catcatcaag	tattacagaa	ttcaaaagag	aaatcgagtg	gatcaaaatg	acaagccata	6660
tgtactaaca	aacaaataac	atatctacag	atcattagat	attaaaatta	taaaaaactt	6720
aggagtaaag	ttacgcaatc	caactctact	catataattg	aggaaggacc	caatagacaa	6780
atccaaattc	gagatggaat	actggaagca	taccaatcac	ggaaaggatg	ctggtaatga	6840
gctggagacg	tctatggcta	ctcatggcaa	caagctcact	aataagactg	ccacaattct	6900
tgcatatgca	acattaattg	tgctatgttc	aagtattctt	catgagataa	ttcatcttga	6960
tgtttctctt	ggtcttatga	attctgatga	gtcacagcaa	ggcattattc	agcctatcat	7020
agaatcatta	aaatcattga	ttgctttggc	caaccagatt	ctatataatg	ttgcaatagt	7080
aattctctct	aaaattgaca	gtatcgaaac	tgtaatactc	tctgctttta	aagatatgca	7140
caccgggagt	atgtccaatg	ccaactgcac	gccaggaaat	ctgcttctgc	atgatgcagc	7200
atacatcaat	ggaataaaca	aattccttgt	acttgaatca	tacaatggga	cgcctaaata	7260
tggaacctct	ctaaatatac	ccagctttat	ccccctagca	acatctcccc	atgggtgtac	7320
tagaatacca	tcattttcac	tcatacaagc	ccattgggtg	tacactcaca	atgtaatgct	7380
tggaatttgt	cttgattttca	cggcatctaa	ccagtattta	tcaatgggga	taatacaaca	7440
atctgctgca	gggtttccaa	ttttcaggac	tatgaaaacc	atttacctaa	gtgatggaat	7500
caatcgcaaa	agctgttcag	tactgctat	accaggagg	tgtgtcttgt	attgctatgt	7560
agctacaagg	tctgaaaaag	aagattatgc	cacgactgat	ctagctgaac	tgagacttgc	7620
tttctattat	tataatgata	cctttattga	aagagtcata	tctcttccaa	atacaacagg	7680
gcagtggggc	acaatcaacc	ctgcagtcgg	aagcgggac	tatcatctag	gctttatctt	7740
atttcttgta	tatggtgggc	tcataaatgg	gactacttct	tacaatgagc	agtcctcacg	7800
ctattttatc	ccaaaacatc	ccaacataac	ttgtgcgggt	aactccagca	aacaggctgc	7860
aatagcacgg	agttcctatg	tcatacgtta	tactcaaac	agggttaattc	agagtgtgtg	7920
tcttatttgt	ccattgtctg	acatgcatac	agaagagtgt	aatctagtta	tgtttaacaa	7980
ttcccaagtc	atgatgggtg	cagaaggtag	gctctatggt	attggtaata	atttgtatta	8040
ttatcaacgc	agttcctctt	ggtgggtctgc	atcgctcttt	tacaggatca	atacagattt	8100
ttctaaagga	attcctccga	tcattgaggc	tcaatgggta	ccgtcctatc	aagttcctcg	8160

tcctggagtc	atgccatgca	atgcaacaag	tttttgccct	gctaattgca	tcacaggggt	8220
gtacgcagat	gtgtggccgc	ttaatgatcc	agaactcatg	tcacgtaatg	ctctgaaccc	8280
caactatcga	tttgctggag	cctttctcaa	aaatgagtc	aaccgaacta	atcccacatt	8340
ctacactgca	tcggctaact	ccctcttaaa	tactaccgga	ttcaacaaca	ccaatcacaa	8400
agcagcatat	acatcttcaa	cctgctttaa	aaacactgga	acccaaaaaa	tttattgttt	8460
aataataatt	gaaatgggct	catctctttt	aggggagttc	caaataatac	cattttttaag	8520
ggaactaatg	ctttaatcat	aattaaccat	aatatgcatc	aatctatcta	taatacaagt	8580
atatgataag	taatcagcaa	tcagacaata	gacaaaaggg	aaatataaaa	aacttaggag	8640
caaagcgtgc	tcgggaaatg	gacactgaat	ctaacaatgg	cactgtatct	gacatactct	8700
atcctgagtg	tcaccttaac	tctcctatcg	ttaaaggtaa	aatagcacaa	ttacacacta	8760
ttatgagtct	acctcagcct	tatgatattg	atgacgactc	aatactagtt	atcactagac	8820
agaaaataaa	acttaataaa	ttggataaaa	gacaacgatc	tattagaaga	ttaaaattaa	8880
tattaactga	aaaagtgaat	gacttaggaa	aatacacatt	tatcagatat	ccagaaatgt	8940
caaaagaaat	gttcaaatta	tatatacctg	gtattaacag	taaagtgact	gaattattac	9000
ttaaagcaga	tagaacatat	agtcaaatga	ctgatggatt	aagagatcta	tggattaatg	9060
tgctatcaaa	attagcctca	aaaaatgatg	gaagcaatta	tgatcttaat	gaagaaatta	9120
ataatatatc	gaaagttcac	acaacctata	aatcagataa	atggtataat	ccattcaaaa	9180
catggtttac	tatcaagtat	gatatgagaa	gattacaaaa	agctcgaaat	gagatcactt	9240
ttaatgttgg	gaaggattat	aacttgtag	aagaccagaa	gaatttctta	ttgatacatc	9300
cagaattgg	tttgatatta	gataaacaaa	actataatgg	ttatctaatt	actcctgaat	9360
tagtattgat	gtattgtgac	gtagtcgaag	gccgatggaa	tataagtgca	tgtgctaagt	9420
tagatccaaa	attacaatct	atgtatcaga	aaggtaataa	cctgtgggaa	gtgatagata	9480
aattgtttcc	aattatggga	gaaaagacat	ttgatgtgat	atcgttatta	gaaccacttg	9540
cattatcctt	aattcaaact	catgatcctg	ttaacaact	aagaggagct	tttttaaatac	9600
atgtgttatac	cgagatggaa	ttaatatattg	aatctagaga	atcgattaag	gaatttctga	9660
gtgtagatta	cattgataaa	attttagata	tatttaataa	gtctacaata	gatgaaatag	9720
cagagatttt	ctcttttttt	agaacatttg	ggcatcctcc	attagaagct	agtattgcag	9780
cagaaaaggt	tagaaaatat	atgtatatattg	gaaaacaatt	aaaatttgac	actattaata	9840
aatgtcatgc	tatcttctgt	acaataataa	ttaacggata	tagagagagg	catggaggac	9900
agtggcctcc	tgtgacatta	cctgatcatg	cacacgaatt	catcataaat	gcttacgggt	9960
caaactctgc	gatatcatat	gaaaatgctg	ttgattatta	ccagagcttt	ataggaataa	10020
aattcaataa	attcatagag	cctcagttag	atgaggattt	gacaatttat	atgaaagata	10080
aagcattatc	tccaaaaaaa	tcaaattggg	acacagttta	tctgcatct	aatttactgt	10140
accgtactaa	cgcacccaac	gaatcacgaa	gattagttga	agtatttata	gcagatagta	10200
aatttgatcc	tcatcagata	ttggattatg	tagaatctgg	ggactgggta	gatgatccag	10260
aatttaatat	ttcttatagt	cttaaagaaa	aagagatcaa	acaggaaggt	agactctttg	10320
caaaaatgac	atacaaaatg	agagctacac	aagttttatc	agagacacta	cttgcaaaata	10380
acataggaaa	attctttcaa	gaaaatggga	tggatgaagg	agagattgaa	ttacttaaga	10440
gattaacaac	catatcaata	tcaggagtgc	cacggtataa	tgaagtgtac	aataattcta	10500
aaagccatac	agatgacctt	aaaacctaca	ataaaataag	taatcttaat	ttgtcttcta	10560
atcagaaatc	aaagaaattt	gaattcaagt	caacggatat	ctacaatgat	ggatacgaga	10620
ctgtgagctg	tttcctaaca	acagatctca	aaaaatactg	tcttaattgg	agatatgaat	10680
caacagctct	atgtggagaa	acttgcaacc	aaatatattg	attaaataaa	ttgtttaatt	10740
ggttacaccc	tcgtcttgaa	ggaagtacaa	tctatgtagg	tgatccttac	tgtcctccat	10800
cagataaaga	acatatatca	ttagaggatc	accctgattc	tggtttttac	gttcataacc	10860
caagaggggg	tatagaagga	ttttgtcaaa	aattatggac	actcatatct	ataagtgcaa	10920
tacatctagc	agctgttaga	ataggcgtga	gggtgactgc	aatggttcaa	ggagacaatc	10980
aagctatagc	tgttaaccaca	agagtaccca	acaattatga	ctacagagtt	aagaaggaga	11040

tagtttataa	agatgtagtg	agattttttg	attcattaag	agaagtgatg	gatgatctag	11100
gtcatgaact	taaattaaat	gaaacgatta	taagtagcaa	gatgttcata	tatagcaaaa	11160
gaatctatta	tgatgggaga	attcttctct	aagctctaaa	agcattatct	agatgtgtct	11220
tctggtcaga	gacagtaata	gacgaaacaa	gatcagcatc	ttcaaatttg	gcaacatcat	11280
ttgcaaaagc	aattgagaat	ggttattcac	ctgttctagg	atatgcatgc	tcaattttta	11340
agaatattca	acaactatat	attgcccttg	ggatgaatat	caatccaact	ataacacaga	11400
atatcagaga	tcagtatttt	aggaatccaa	attggatgca	atatgcctct	ttaataacctg	11460
ctagtgttgg	gggattcaat	tacatggcca	tgtcaagatg	ttttgtaagg	aatattggtg	11520
atccatcagt	tgccgcattg	gctgatatta	aaagatttat	taaggcgaat	ctattagacc	11580
gaagtgttct	ttataggatt	atgaatcaag	aaccagggtga	gtcatctttt	ttggactggg	11640
cttcagatcc	atattcatgc	aatttaccac	aatctcaaaa	tataaccacc	atgataaaaa	11700
atataacagc	aaggaatgta	ttacaagatt	caccaaattcc	attattatct	ggattattca	11760
caaatacaat	gatagaagaa	gatgaagaat	tagctgagtt	cctgatggac	aggaaggtaa	11820
ttctccctag	agttgcacat	gatattctag	ataattctct	cacaggaatt	agaaatgcca	11880
tagctggaat	gtagatagc	acaaaatcac	taattcgggt	tggcataaat	agaggaggac	11940
tgacatatag	tttgttgagg	aaaatcagta	attacgatct	agtacaatat	gaaacactaa	12000
gtaggacttt	gcgactaatt	gtaagtgata	aaatcaagta	tgaagatatg	tgttcggtag	12060
accttgccat	agcattgcga	caaaagatgt	ggattcattt	atcaggagga	aggatgataa	12120
gtggacttga	aacgcctgac	ccattagaat	tactatctgg	ggtagtaata	acaggatcag	12180
aacattgtaa	aatatgttat	tcttcagatg	gcacaaaccc	atatacttgg	atgtattttac	12240
ccggtaatat	caaaatagga	tcagcagaaa	caggtatata	gtcattaaga	gttccttatt	12300
ttggatcagt	cactgatgaa	agatctgaag	cacaattagg	atatatcaag	aatcttagta	12360
aacctgcaaa	agccgcaata	agaatagcaa	tgatatatac	atgggcattt	ggtaatgatg	12420
agatatcttg	gatggaagcc	tcacagatag	cacaaacacg	tgcaaatttt	acactagata	12480
gtctcaaaaat	tttaacaccg	gtagctacat	caacaaattt	atcacacaga	ttaaaggata	12540
ctgcaactca	gatgaaattc	tccagtacat	cattgatcag	agtcagcaga	ttcataacaa	12600
tgtccaatga	taacatgtct	atcaaagaag	ctaataaac	caaagatact	aatcttattt	12660
atcaacaaat	aatgttaaca	ggattaagtg	ttttcgaata	tttattttaga	ttaaaagaaa	12720
ccacaggaca	caaccctata	gttatgcata	tgacacataga	agatgagtgt	tgtattaaag	12780
aaagttttaa	tgatgaacat	attaatccag	agtctacatt	agaattaatt	cgatatcctg	12840
aaagtaatga	atttattttat	gataaagacc	cactcaaaga	tgtggactta	tcaaaactta	12900
tggttattaa	agaccattct	tacacaattg	atatgaatta	ttgggatgat	actgacatca	12960
tacatgcaat	ttcaatatgt	actgcaatta	caatagcaga	tactatgtca	caattagatc	13020
gagataattt	aaaagagata	atagttattg	caaatgatga	tgatattaat	agcttaatca	13080
ctgaattttt	gactcttgac	atacttgtat	ttctcaagac	atttggtgga	ttattagtaa	13140
atcaatttgc	atacactctt	tatagtctaa	aaatagaagg	tagggatctc	atttgggatt	13200
atataatgag	aacactgaga	gatacttccc	attcaatatt	aaaagtatta	tctaatgcat	13260
tatctcatcc	taaagtattc	aagaggttct	gggattgtgg	agtttttaaac	cctattttatg	13320
gtcctaatac	tgctagtcaa	gaccagataa	aacttgccct	atctatatgt	gaatattcac	13380
tagatctatt	tatgagagaa	tggttgaatg	gtgtatcact	tgaaatatac	atttgtgaca	13440
gcgatatgga	agttgcaaat	gataggaaac	aagcctttat	ttctagacac	ctttcatttg	13500
tttgttgttt	agcagaaatt	gcactcttcg	gacctaacct	gttaaactta	acatacttgg	13560
agagacttga	tctattgaaa	caatatcttg	aattaaatat	taaagaagac	cctactctta	13620
aatatgtaca	aatatctgga	ttattaatta	aatcgttccc	atcaactgta	acatacgtaa	13680
gaaagactgc	aatcaaatat	ctaaggattc	gcggtattag	tccacctgag	gtaattgatg	13740
attgggatcc	ggtagaagat	gaaaatatgc	tggataacat	tgtcaaaact	ataaatgata	13800
actgtaataa	agataataaa	gggaataaaa	ttaacaattt	ctggggacta	gcacttaaga	13860
actatcaagt	ccttaaaatc	agatctataa	caagtgatcc	tgatgataat	gatagactag	13920

atgctaatac aagtgggttg acacttcctc aaggagggaa ttatctatcg catcaattga 13980  
 gattattcgg aatcaacagc actagtgtgc tgaaagctct tgagttatca caaatTTTTaa 14040  
 tgaaggaagt caataaagac aaggacaggc tcttcctggg agaaggagca ggagctatgc 14100  
 tagcatgtta tgatgccaca ttaggacctg cagttaatta ttataattca ggtttgaata 14160  
 taacagatgt aattgggtcaa cgagaattga aaatatttcc ttcagaggta tcattagtag 14220  
 gtaaaaaatt aggaaatgtg acacagattc ttaacagggt aaaagtactg ttcaatggga 14280  
 atcctaattc aacatggata ggaaatatgg aatgtgagag cttaatatgg agtgaattaa 14340  
 atgataagtc cattggatta gtacattgtg atatggaagg agctatcggg aaatcagaag 14400  
 aaactgttct acatgaacat tatagtgtta taagaattac atacttgatt ggggatgatg 14460  
 atgttgTTTT agtttccaaa attataccta caatcactcc gaattgggtc agaatacttt 14520  
 atctatataa attatatagg aaagatgtaa gtataaatc actcaaaact tctaactctg 14580  
 catcaacaga attatatcta atttcgaaag atgcatattg tactataatg gaacctagtg 14640  
 aaattgTTTT atcaaaactt aaaagattgt cactcttggg agaaaataat ctattaaaat 14700  
 ggatcatttt atcaaagaag aggaataatg aatggttaca tcatgaaatc aaagaaggag 14760  
 aaagagatta tggaatcatg agaccatattc atatggcact acaaactctt ggatttcaaa 14820  
 tcaattttaa tcatctggcg aaagaatttt tatcaacccc agatctgact aatatcaaca 14880  
 atataatcca aagttttcag cgaacaataa aggatgtttt atttgaatgg attaatataa 14940  
 ctcatgatga taagagacat aaattaggcg gaagatataa catattccca ctgaaaaata 15000  
 agggaaagtt aagactgcta tgcagaagac tagtattaag ttggatttca ttatcattat 15060  
 cgactcgatt acttacaggt cgctttcctg atgaaaaatt tgaacataga gcacagactg 15120  
 gatatgtatc attagctgat actgatttag aatcattaaa gttattgtcg aaaaacatca 15180  
 ttaagaatta cagagagtgt ataggatcaa tatcatattg gtttctaacc aaagaagtta 15240  
 aaatacttat gaaattgatc ggtggtgcta aattattagg aattcccaga caatataaag 15300  
 aaccgaaga ccagttatta gaaaactaca atcaacatga tgaatttgat atcgattaaa 15360  
 acataaatac aatgaagata tctctaacc tttatcttta agcctaggaa tagacaaaaa 15420  
 gtaagaaaaa catgtaatat atatatacca aacagagttc ttctcttgtt tggt 15474

<210> 42

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Sequence  
spanning PIV3 F 5' ntr and PIV2 F ectodomain.

<400> 42

caagcactga acatgcatca cctg

24

<210> 43

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Sequence

spanning PIV2 F ectodomain and PIV3 F  
transmembrane/cytoplasmic domains.

<400> 43  
ctttattcac taatcataat tatt

24

<210> 44  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Sequence  
spanning PIV3 F transmembrane/cytoplasmic domains  
and PIV3 F 3' ntr.

<400> 44  
acaaacaaat aacatatcta caga

24

<210> 45  
<211> 4  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Terminal amino  
acids of PIV2 F ectodomain.

<400> 45  
Met His His Leu  
1

<210> 46  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Terminal amino  
acids of PIV2 F ectodomain.

<400> 46  
Leu Tyr Ser Leu Ile Ile Ile Ile  
1 5

<210> 47  
<211> 21  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Sequence  
spanning PIV3 HN 5' ntr and PIV3 HN  
transmembrane/cytoplasmic domains.

<400> 47  
tccaaattcg agatggaata c

21

<210> 48  
<211> 27  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Sequence  
spanning PIV3 HN transmembrane/cytoplasmic domains  
and PIV2 HN ectodomain.

<400> 48  
attaattcca tccatgagat aattcat

27

<210> 49  
<211> 33  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Sequence  
spanning PIV2 HN ectodomain and PIV3 HN 3' ntr,  
with extra nucleotides.

<400> 49  
gaactaatgc tttaagcttc ataattaacc ata

33

<210> 50  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Terminal amino acids bridging fused PIV3 HN transmembrane/cytoplasmic domains and PIV2 HN ectodomain.

<400> 50

Ile Asn Ser Ile His Glu Leu Ile His

1

5

<210> 51

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Terminal amino acids of PIV2 HN ectodomain.

<400> 51

Glu Leu Met Leu

1

<210> 52

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Sequence spanning PIV2 F ectodomain/transmembrane domain and PIV3 F cytoplasmic domain.

<400> 52

gcctacatca tcaagtatta c

21

<210> 53

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Sequence spanning PIV3 F cytoplasmic domain and PIV3 F3' ntr.



<400> 53  
ataaaccat aacatatcta caga

24

<210> 54  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Terminal amino  
acids bridging fused PIV2 F  
ectodomain/transmembrane domain and PIV3 F  
cytoplasmic domain.

<400> 54  
Ala Tyr Ile Ile Lys Tyr Tyr  
1 5

<210> 55  
<211> 24  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Sequence  
spanning PIV3 HN cytoplasmic domain and PIV2 HN  
transmembrane/ectodomains.

<400> 55  
ctcactaata agactgccac aatt

24

<210> 56  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Sequence  
spanning PIV2 HN transmembrane/ectodomains and  
PIV3 HN 3' ntr.

<400> 56  
gaactaatgc tttaatcata attaaccata

30

<210> 57

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Terminal amino acids bridging fused PIV3 HN cytoplasmic domain and PIV2 HN transmembrane/ectodomains.

<400> 57

Leu Thr Asn Lys Thr Ala Thr Ile

1

5